

WHAT IS CLAIMED IS:

1. A method of implanting first and second stents with associated grafts within first and second vessel regions extending at an angle with respect to each other, the method comprising:

inserting a first guidewire to guide a first stent with an associated first graft to the first vessel region;

inserting a second guidewire to guide a second stent with an associated second graft to the second vessel region;

inserting a first delivery sheath containing the first stent with the associated first graft over the first guidewire to the first target vessel region;

removing the first delivery sheath to enable the first stent with the associated first graft to expand against the wall of the first vessel region;

inserting a second delivery sheath containing the second stent with the associated second graft over the second guidewire to the second vessel region; and

removing the second delivery sheath to enable the second stent with the associated second graft to expand against the wall of the second vessel region and fluidly communicate with the first stent and associated first graft.

2. The method of claim 2, wherein the step of inserting the second delivery sheath includes the step of inserting the delivery sheath through an opening in a sidewall of the first graft to enable the first and second grafts to fluidly communicate.

3. The method of claim 2, wherein the step of removing the second delivery sheath comprises removing the sheath through the expanded first stent.

4. The method of claim 3, wherein the first and second stents are made of shape memory material and the step of removing the first and second sheaths to enable the first and second stents to expand causes the first and second stents to automatically expand against the vessel wall.

5. The method of claim 3, wherein the step of removing the first and second sheaths to enable the first and second stents to expand provides room for expansion of the first and second stents, and the method further comprises the step of inflating a balloon to expand each of the stents.

6. A method of implanting a first and second graft within the carotid arteries comprising:

inserting a first guidewire into a common carotid artery and extending into an internal carotid artery to guide a first stent having a first graft to a target region of the common carotid artery;

inserting a second guidewire into the common carotid artery and extending into an external carotid artery to guide a second stent having a second graft to the external carotid artery;

inserting the first stent and first graft over the first guidewire to a stenosed region in the carotid artery to enable the first stent and first graft to expand against the stenosed region, the first graft extending into the internal common artery past the juncture of the common carotid artery and the external carotid artery; and

inserting the second stent with the second graft over the second guidewire to the external carotid artery to enable the second stent and second graft to expand against the wall of the external carotid artery, thereby maintaining flow between the common carotid artery and the external carotid artery.

7. The method of claim 6, wherein the step of inserting the second stent and graft comprises the step of inserting the second stent and graft through the first stent and graft.

8. The method of claim 7, wherein the step of inserting the second stent and graft through the first stent and graft comprises the step of inserting the second stent and graft through an opening in the sidewall of the first stent and graft.

9. The method of claim 8, further comprising the steps of withdrawing a first sheath to expose the first stent and graft to allow expansion thereof and withdrawing a second sheath to expose the second stent and graft to allow expansion thereof.

10. A method of implanting a stent within first and second vessel regions extending at an angle with respect to each other, the method comprising:

inserting a first guidewire to guide a first stent and first graft portion to the first vessel region;

inserting a second guidewire to guide a second stent and second graft portion to a second vessel region;

inserting a delivery sheath containing the first and second stent and graft portions over the first and second guidewires, respectively, to the vessel regions; and

removing the delivery sheath to enable the first stent and graft portion to expand against the wall of the first vessel and to enable the second stent and graft portion to expand against the wall of the second vessel.

11. The method of claim 10, further comprising the steps of folding the second graft portion towards the first graft portion and inserting the stent and graft portions inside the delivery sheath in the folded condition prior to inserting the delivery device over the guidewires.

12. A method of implanting a stent with associated grafts within first and second vessel regions extending at an angle with respect to each other, the stent having a first portion and a second portion extending at an angle to the first portion, the method comprising:

inserting a first guidewire to guide the first stent portion with an associated first graft to the first vessel region;

inserting a second guidewire to guide the second stent portion with an associated second graft to the second vessel region;

inserting a first delivery sheath containing the first stent portion with the associated first graft over the first guidewire to the first vessel region and a second

delivery sheath containing the second stent portion with the associated second graft over the second guidewire to the second vessel region;

removing the first delivery sheath to enable the first stent portion with the associated first graft to expand against the wall of the first vessel region; and

removing the second delivery sheath to enable the second stent portion with the associated second graft to expand against the wall of the second vessel region and fluidly communicate with the first stent and associated graft.

13. The method of claim 12, wherein the second delivery sheath is contained within the first delivery sheath so that the step of removing the first delivery sheath includes the step of withdrawing the first delivery sheath over the second delivery sheath.

14. The method of claim 13, wherein the step of inserting the second delivery sheath includes the step of inserting the second delivery sheath through an opening in the first delivery sheath.

15. The method of claim 12, wherein the second guidewire is a dummy wire and the step of inserting the second guidewire into the second vessel region occurs after the first delivery sheath is inserted into the patient.

16. A method of implanting within the carotid arteries a bifurcated graft having a first graft portion and a second graft portion, the method comprising:

inserting a first guidewire into a common carotid artery and extending into an internal carotid artery to guide a first graft portion into the internal carotid artery;

inserting a second guidewire into the common carotid artery and extending into an external carotid artery to guide the second graft portion to the external carotid artery; and

inserting the first and second graft portions over the first and second guidewires, respectively, so the first graft portion extends into the internal common artery past the juncture of the common carotid artery and the external carotid artery and inserting the second graft portion over the second guidewire into the external carotid artery to enable the second stent graft portion to expand against the wall of the external carotid artery,

thereby maintaining flow between the common carotid artery and the external carotid artery.

17. The method of claim 16, further comprising the step of withdrawing a first sheath positioned over the first graft portion to allow expansion of the first graft portion.

18. The method of claim 17, further comprising the step of withdrawing a second sheath positioned over the second graft portion to allow expansion of the second graft portion.

19. The method of claim 16, further comprising the step of withdrawing a sheath positioned over the second graft portion to allow expansion of the second graft portion.

20. The method of claim 18, further comprising the step of inserting an insertion tube into the common carotid artery, the first and second sheaths being positioned within the insertion tube.

21. A delivery system for a bifurcated stent comprising:
a bifurcated stent having a first portion and a second portion extending at an angle to the first portion;

a first delivery sheath having a first diameter, the first stent portion being positioned within the first delivery sheath;

a second delivery sheath having a second diameter smaller than the first diameter of the first delivery sheath, the second delivery sheath being at least partially positioned within an axial opening in the first delivery sheath and having a distal end portion positioned at an angle to a distal end portion of the first delivery sheath; and

an insertion member having a third diameter greater than the second diameter, the first and second delivery sheaths positioned within the insertion member, the insertion member maintaining the distal end portions of the first and second delivery sheaths in closer proximity, wherein removal of the insertion member enables the distal end

portions to move further apart for positioning within first and second blood vessel portions extending at an angle to each other.

22. The system of claim 21, wherein the second delivery sheath has a lumen dimensioned to receive a guidewire therethrough.

23. The system of claim 22, wherein the first delivery sheath has a side opening for extension of the second delivery sheath therethrough.

24. The system of claim 23, further comprising a graft positioned over the first stent portion and over the second stent portion.

25. The system of claim 21, wherein the first and second portions include a longitudinally extending spine and a plurality of curved ribs extending from the spine.

26. The system of claim 25, wherein the ribs terminate at first and second tips which interleave with first and second tips of adjacent ribs.

27. The system of claim 21, wherein the first and second portions include a series of spines spaced axially and radially with respect to each other.